
WHY SCIENTIFIC RESEARCH MUST GUIDE EDUCATIONAL POLICY AND INSTRUCTIONAL PRACTICES IN LEARNING DISABILITIES

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SOME BACKGROUND

When I initiated my research program in the neuropsychology of learning disabilities (LDs) in 1974, I was guided in part by the scholarship of William Cruickshank, Helmer Myklebust, Doris Johnson, and Samuel Kirk, among others. These gifted pioneers made an indelible impact on my thinking and my research over the years. I found compelling their clinical insights about children who had significant reading problems (and other academic problems) despite robust intellectual capability, since I worked with many such children as a psychologist in the public schools. I also learned a great deal from them about the instructional skills that teachers must possess in order to address individual differences in learning. I was particularly fascinated by this concept of “unexpected underachievement” and the paradox of learning difficulties in an intellectually competent student.

Misguided Assumptions

As I became interested in this concept of “unexpected underachievement,” I was struck by the heterogeneity of reading difficulties that I observed in schools. When I began my research career, I focused on this heterogeneity and asked whether children identified with LDs in reading could be assigned to more homogeneous subtypes, with each subtype described by different reading-related deficits. My goal, if I found subtypes, was to then identify and validate subtype-by-treatment interactions.

Unfortunately, my search for valid subtypes and interactions with different treatments was unsuccessful for several reasons. Fundamentally, my work was based on scientifically untested assumptions underlying the construct of LDs: I assumed that the definition of LDs at that time was valid and I assumed that LDs was a dis-

tinct category of disability that could be differentiated empirically from other categories through psychometric (e.g., IQ-achievement discrepancies) and exclusionary criteria.

I was wrong on both counts, but I figured I might not be alone in making these assumptions. At the same time, it was clear to me that the field had made significant contributions by bringing special education services to students with LDs – services that had previously been denied. By 1969, parental and professional advocacy resulted in federal recognition of LDs and access to due process to ensure a free and appropriate public education. However, it troubled me that federal policy may have been based on the same flawed assumptions that I had made. While I did not have any doubts that LDs constituted a genuine category of exceptionality, I came to realize that the definition of LDs, instantiated in federal legislation, was based upon clinical observations and anecdotal evidence rather than replicated scientific evidence.

Lessons Learned

To make myself feel better I could make the excuse that my faulty assumptions were based on the knowledge of LDs available at the time. But that doesn’t cut it. In hindsight, I should have broadened my view of LDs beyond the literature specific to the field and my training (experimental and physiological psychology, learning disabilities), and turned to the literatures in the developmental, cognitive, linguistic, psychometric and classification sciences as well. When I eventually did examine these sources in depth, I learned a great deal about individual differences, principles of classification, continuous distributions, the vagaries of establishing cut points along the normal distribution, and the fact

that there were significant problems with the notion that IQ scores are valid predictors of learning potential. I learned that a comparison of IQ scores with achievement scores to derive a discrepancy as a marker for LDs is fraught with psychometric, statistical, and conceptual problems that render the putative relationship between the scores unreliable and meaningless (see Steubing et al., 2002, for a review of these issues). In addition, I learned that using a discrepancy metric in the identification of LDs may harm children more than it helps, not only because criteria are inconsistent across states and schools, but also because a discrepancy typically requires failure to occur (i.e., a “wait to fail” model), negating prevention efforts (Fletcher, Lyon, et al., 2002; Lyon, Fletcher et al., 2001).

I also learned that using exclusionary criteria in the identification process reflects a characterization of what someone is not, rather than what he or she is. It dawned on a number of us that exclusionary criteria such as inadequate instruction and socioeconomic factors could lead to inadequate neural, linguistic, and cognitive development – factors that historically and currently serve as clinical markers of LDs (Lyon, Fletcher, & Barnes, 2003).

From a methodological perspective, my review of the literature and my collaborations with Jack Fletcher, Sally and Bennett Shaywitz, Robin Morris, David Francis, Louisa Moats, Sharon Vaughn, Barbara Keogh, David Gray, and others, have taught me that studying ill-defined school- and clinic-identified samples of children with LDs virtually prohibited replication and generalization of findings given the variability in identification practices used across sites (see Lyon, Gray, Kavanagh, & Krasnegor, 1993). In addition, conceptual and psychometric limitations in measurement practices confounded identification practices (see Lyon, 1994). Of significant concern was the lack of systematic prospective, longitudinal studies of LDs. This is understandable given that there was insufficient funding for these investigations until 1985 when Congress charged the NICHD with the task of establishing multidisciplinary research centers for the study of LDs. However, it became clear that the developmental nature of LDs required an analysis of change over time, and how such change interacts with different interventions, child characteristics, teacher characteristics, and classroom climates.

What surfaced as a stark reality was the fact that despite the influence of multiple disciplines (education, neurology, psychology, language development and disorders, etc.) in the early development of the field, few multidisciplinary research studies could be found in the LDs literature, even as late as the mid-1980s. This lack of collaboration across scientific fields precluded

comprehensive studies that could contribute to the development of a valid classification system for LDs – a classification system that had the potential to depict interrelationships with, and distinctions among, other childhood disorders; identify etiologies and differential response to interventions; and identify outcomes within a developmental context.

Closing Some Gaps

Lessons learned should lead to efforts to close critical gaps in knowledge. Even by the mid-1980s it was clear that systematic collaborative research grounded in classification methodology, including the construction of theory-driven hypotheses, the selection and development of valid measures to test hypotheses, and replication of findings, had to be initiated to define and comprehensively understand LDs so that effective interventions could be developed and implemented. We were also convinced that research on LDs had to be conducted within a developmental framework (Francis, Shaywitz, Steubing, Shaywitz, & Fletcher, 1994). Within this context, we wanted to begin to study children before their entry into formal schooling and follow the same children over time to investigate their academic, cognitive, linguistic, perceptual, attentional, genetic, and neurobiological characteristics for at least five years.

Beginning in 1983 with the Connecticut Longitudinal Study (Shaywitz, Shaywitz, & Fletcher, 1992), with additions to the NICHD research program in 1987 (Lyon, 1996), we were able to initiate new multidisciplinary prospective, longitudinal studies to define and classify LDs, to identify the multiple factors responsible for their presentation, and to develop multiple interventions and determine their effectiveness. Indeed, cohorts of children recruited for study in 1983 and 1987 are still being studied by collaborative multidisciplinary teams at 44 research sites as they enter their adolescence and adulthood.

Extensive replicated findings from this NICHD research network have been reviewed elsewhere in detail (see Lyon, Fletcher & Barnes, 2003, and Lyon, Fletcher, Fuchs, & Chhabra, in press). While we have learned a great deal, we must sustain and build on our research investments to ensure that the educational and social needs of children and adults with LDs are addressed in an optimal manner.

MOVING FORWARD: BUILDING RESEARCH PROGRAMS FOR THE FUTURE

What Should Our Research Programs Look Like?

Scientists in the field must be supported sufficiently by both federal and non-federal sources to conduct cross-sectional and longitudinal studies carried out by

investigators collaborating across disciplines. Despite the long-term multidisciplinary efforts undertaken by the NICHD, many studies of LDs continue to be investigations at one point in developmental space. Many studies remain bereft of collaboration and communication across disciplines and replication of findings.

It is also time for funding agencies to collaborate in identifying research priorities and to co-fund critical initiatives. Fortunately, some positive strides have been made recently with joint initiatives designed by NICHD, the Office of Special Education Programs (OSEP) under the leadership of Lou Danielson, and the Institute of Educational Sciences (IES) under the leadership of Russ Whitehurst.

A future goal must be to establish a genuine science of LDs. We must also broaden our intensive research efforts in reading to address LDs in mathematics and written language, as well as in adolescence and bilingual populations. NICHD is now partnering with OSEP within the Department of Education to develop extensive research programs in these areas.

What Research Must Do

First, we must continue our efforts to refine the definition of LDs. Our data tell us that IQ-achievement discrepancies and exclusionary criteria are invalid markers for LDs, reinforcing a wait-to-fail model. We know that early identification and prevention is not only critical but essential (Lyon et al., in press), and we must have the courage to jettison these concepts if necessary. But we also have to identify valid alternatives for identification. Recent and planned studies to determine the utility of response-to-instruction models in the identification and early intervention of LDs hold promise (see Fuchs & Fuchs, 1998; Fuchs, Fuchs, & Compton, 2004; Lyon et al., in press; Vaughn & Fuchs, 2003).

Second, our replicated research findings must inform educational policy. For too long, federal and state educational policies have been predicated on anecdotal evidence, philosophical positions, and untested assumptions – not scientific evidence. For the first time, with the passage of the No Child Left Behind Act, The Reading First program, and the recently enacted IDEA legislation, scientific evidence now plays a major role in their content (see Lyon, Shaywitz, Shaywitz, & Chhabra, 2005; President's Commission on Excellence in Special Education, 2002).

Third, replicated scientific research findings must inform professional development and instructional practices. The frequently heard statement that children with LDs are actually "teaching disabled" is unfortunately accurate in many cases. Much evidence shows that teachers are not trained to address individual learn-

ing differences in general and are not prepared to teach students from highly diverse backgrounds with a range of complicated learning difficulties. Moreover, many teachers are not prepared to read, understand, and keep abreast of critical research findings to inform their practice.

Effecting meaningful change in the lives of children and teachers requires that we not only have sound scientific findings, but also that we understand how we can translate them so that they inform our efforts in complex educational environments. Until we accomplish this, rigorous professional development programs, effective instructional practices, and research-based educational policies will lag far behind the needs of children with LDs.

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AUTHOR'S NOTE

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